

BONDING OF PARTS WITH DISSIMILAR THERMAL EXPANSION COEFFICIENTS

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ABSTRACT OF THE DISCLOSURE

A method for bonding materials with different thermal expansion coefficients is provided. An intermediary layer of glass, ceramics, polymers, metals or composites is inserted between the materials to be bonded; this intermediary layer has a compositional gradient that could have been formed through diffusion processes. The coefficient of thermal expansion changes across the intermediary layer and on each side it is not substantially different from the coefficient of thermal expansion of the material that the layer is facing. In that manner there is nowhere within the intermediate layer or on the interfaces to the materials being bonded that thermally induced stress will cause fractures or significant permanent plastic deformation. The thickness of the intermediary layer depends on the difference in the coefficient of thermal expansion between the two materials being bonded, the temperature range the bond will be exposed to and the elasticity.